09/508342

5●●●d PCT/PTO 1 0 MAR 2000

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SEQUENCE LISTING

<110> SAKAKI, Yoshiyuki

<120> Mammalian Genes Involved in Circadian Periods

<130> SEN-903PCT

<150> JP 9-267846
<151> 1997-09-12

<160> 4

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<212> PRT
<213> Homo sapiens

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Met Ser Gly Pro Leu Glu Gly Ala Asp Gly Gly Gly Asp Pro Arg Pro
1   5   10   15

Gly Glu Ser Phe Cys Pro Gly Gly Val Pro Ser Pro Gly Pro Pro Gln
                20   25   30

His Arg Pro Cys Pro Gly Pro Ser Leu Ala Asp Asp Thr Asp Ala Asn
        35   40   45

Ser Asn Gly Ser Ser Gly Asn Glu Ser Asn Gly His Glu Ser Arg Gly
    50   55   60

Ala Ser Gln Arg Ser Ser His Ser Ser Ser Ser Gly Asn Gly Lys Asp
65   70   75   80

Ser Ala Leu Leu Glu Thr Thr Glu Ser Ser Lys Ser Thr Asn Ser Gln
                85   90   95

Ser Pro Ser Pro Pro Ser Ser Ser Ile Ala Tyr Ser Leu Leu Ser Ala

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　　　　　　　　　　　100　　　　　　　　　　105　　　　　　　　　　110

Ser Ser Glu Gln Asp Asn Pro Ser Thr Ser Gly Cys Ser Ser Glu Gln
　　　　　　115　　　　　　　　　　120　　　　　　　　　　125

Ser Ala Arg Ala Arg Thr Gln Lys Glu Leu Met Thr Ala Leu Arg Glu
　　　　130　　　.　　　　　　135　　　　　　　　　　140

Leu Lys Leu Arg Leu Pro Pro Glu Arg Arg Gly Lys Gly Arg Ser Gly
145　　　　　　　　　　150　　　　　　　　　　155　　　　　　　　　　160

Thr Leu Ala Thr Leu Gln Tyr Ala Leu Ala Cys Val Lys Gln Val Gln
　　　　　　　　　　165　　　　　　　　　　170　　　　　　　　　　175

Ala Asn Gln Glu Tyr Tyr Gln Gln Trp Ser Leu Glu Glu Gly Glu Pro
　　　　　　　　180　　　　　　　　　　185　　　　　　　　　　190

Cys Ser Met Asp Met Ser Thr Tyr Thr Leu Glu Glu Leu Glu His Ile
　　　　　　195　　　　　　　　　　200　　　　　　　　　　205

Thr Ser Glu Tyr Thr Leu Gln Asn Gln Asp Thr Phe Ser Val Ala Val
　　　　210　　　　　　　　　　215　　　　　　　　　　220

Ser Phe Leu Thr Gly Arg Ile Val Tyr Ile Ser Glu Gln Ala Ala Val
225　　　　　　　　　　230　　　　　　　　　　235　　　　　　　　　　240

Leu Leu Arg Cys Lys Arg Asp Val Phe Arg Gly Thr Arg Phe Ser Glu
　　　　　　　　245　　　　　　　　　　250　　　　　　　　　　255

Leu Leu Ala Pro Gln Asp Val Gly Val Phe Tyr Gly Ser Thr Ala Pro
　　　　　　　　260　　　　　　　　　　265　　　　　　　　　　270

Ser Arg Leu Pro Thr Trp Gly Thr Gly Ala Ser Ala Gly Ser Gly Leu
　　　　　　275　　　　　　　　　　280　　　　　　　　　　285

Arg Asp Phe Thr Gln Glu Lys Ser Val Phe Cys Arg Ile Arg Gly Gly
　　　　290　　　　　　　　　　295　　　　　　　　　　300

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Pro Asp Arg Asp Pro Gly Pro Arg Tyr Gln Pro Phe Arg Leu Thr Pro
305   310   315   320

Tyr Val Thr Lys Ile Arg Val Ser Asp Gly Ala Pro Ala Gln Pro Cys
                325   330   335

Cys Leu Leu Ile Ala Glu Arg Ile His Ser Gly Tyr Glu Ala Pro Arg
            340   345   350

Ile Pro Pro Asp Lys Arg Ile Phe Thr Thr Arg His Thr Pro Ser Cys
            355   360   365

Leu Phe Gln Asp Val Asp Glu Arg Ala Ala Pro Leu Leu Gly Tyr Leu
        370   375   380

Pro Gln Asp Leu Leu Gly Ala Pro Val Leu Leu Phe Leu His Pro Glu
385   390   395   400

Asp Arg Pro Leu Met Leu Ala Ile His Lys Lys Ile Leu Gln Leu Ala
                405   410   415

Gly Gln Pro Phe Asp His Ser Pro Ile Arg Phe Cys Ala Arg Asn Gly
            420   425   430

Glu Tyr Val Thr Met Asp Thr Ser Trp Ala Gly Phe Val His Pro Trp
        435   440   445

Ser Arg Lys Val Ala Phe Val Leu Gly Arg His Lys Val Arg Thr Ala
        450   455   460

Pro Leu Asn Glu Asp Val Phe Thr Pro Pro Ala Pro Ser Pro Ala Pro
465   470   475   480

Ser Leu Asp Thr Asp Ile Gln Glu Leu Ser Glu Gln Ile His Arg Leu
                485   490   495

Leu Leu Gln Pro Val His Ser Pro Ser Pro Thr Gly Leu Cys Gly Val
            500   505   510

Gly Ala Val Thr Ser Pro Gly Pro Leu His Ser Pro Gly Ser Ser Ser
    515   520   525

Asp Ser Asn Gly Gly Asp Ala Glu Gly Pro Gly Pro Pro Ala Pro Val
    530   535   540

Thr Phe Gln Gln Ile Cys Lys Asp Val His Leu Val Lys His Gln Gly
545   550   555   560

Gln Gln Leu Phe Ile Glu Ser Arg Ala Arg Pro Gln Ser Arg Pro Arg
          565   570   575

Leu Pro Ala Thr Gly Thr Phe Lys Ala Lys Ala Leu Pro Cys Gln Ser
          580   585   590

Pro Asp Pro Glu Leu Glu Ala Gly Ser Ala Pro Val Gln Ala Pro Leu
          595   600   605

Ala Leu Val Pro Glu Glu Ala Glu Arg Lys Glu Ala Ser Ser Cys Ser
          610   615   620

Tyr Gln Gln Ile Asn Cys Leu Asp Ser Ile Leu Arg Tyr Leu Glu Ser
625   630   635   640

Cys Asn Leu Pro Ser Thr Thr Lys Arg Lys Cys Ala Ser Ser Ser Ser
          645   650   655

Tyr Thr Thr Ser Ser Ala Ser Asp Asp Asp Arg Gln Arg Thr Gly Pro
          660   665   670

Val Ser Val Gly Thr Lys Lys Asp Pro Pro Ser Ala Ala Leu Ser Gly
          675   680   685

Glu Gly Ala Thr Pro Arg Lys Glu Pro Val Val Gly Gly Thr Leu Ser
          690   695   700

Pro Leu Ala Leu Ala Asn Lys Ala Glu Ser Val Val Ser Val Thr Ser

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            705                    710                    715                    720

Gln Cys Ser Phe Ser Ser Thr Ile Val His Val Gly Asp Lys Lys Pro
                    725                    730                    735

Pro Glu Ser Asp Ile Ile Met Met Glu Asp Leu Pro Gly Leu Ala Pro
                    740                    745                    750

Gly Pro Ala Pro Ser Pro Ala Pro Ser Pro Thr Val Ala Pro Asp Pro
                    755                    760                    765

Ala Pro Asp Ala Tyr Arg Pro Val Gly Leu Thr Lys Ala Val Leu Ser
            770                    775                    780

Leu His Thr Gln Lys Glu Glu Gln Ala Phe Leu Ser Arg Phe Arg Asp
785                    790                    795                    800

Leu Gly Arg Leu Arg Gly Leu Asp Ser Ser Ser Thr Ala Pro Ser Ala
                    805                    810                    815

Leu Gly Glu Arg Gly Cys His His Gly Pro Ala Pro Pro Ser Arg Arg
                    820                    825                    830

His His Cys Arg Ser Lys Ala Lys Arg Ser Arg His His Gln Asn Pro
            835                    840                    845

Arg Ala Glu Ala Pro Cys Tyr Val Ser His Pro Ser Pro Val Pro Pro
            850                    855                    860

Ser Thr Pro Trp Pro Thr Pro Pro Ala Thr Thr Pro Phe Pro Ala Val
865                    870                    875                    880

Val Gln Pro Tyr Pro Leu Pro Val Phe Ser Pro Arg Gly Gly Pro Gln
                    885                    890                    895

Pro Leu Pro Pro Ala Pro Thr Ser Val Pro Pro Ala Ala Phe Pro Ala
                    900                    905                    910
```

Pro Leu Val Thr Pro Met Val Ala Leu Val Leu Pro Asn Tyr Leu Phe
     915   920   925

Pro Thr Pro Ser Ser Tyr Pro Tyr Gly Ala Leu Gln Thr Pro Ala Glu
     930   935   940

Gly Pro Pro Thr Pro Ala Ser His Ser Pro Ser Pro Ser Leu Pro Ala
945   950   955   960

Leu Pro Pro Ser Pro Pro His Arg Pro Asp Ser Pro Leu Phe Asn Ser
           965   970   975

Arg Cys Ser Ser Pro Leu Gln Leu Asn Leu Leu Gln Leu Glu Glu Leu
          980   985   990

Pro Arg Ala Glu Gly Ala Ala Val Ala Gly Gly Pro Gly Ser Ser Ala
        995   1000   1005

Gly Pro Pro Pro Pro Ser Ala Glu Ala Ala Glu Pro Glu Ala Arg Leu
     1010   1015   1020

Ala Glu Val Thr Glu Ser Ser Asn Gln Asp Ala Leu Ser Gly Ser Ser
1025   1030   1035   1040

Asp Leu Leu Glu Leu Leu Leu Gln Glu Asp Ser Arg Ser Gly Thr Gly
          1045   1050   1055

Ser Ala Ala Ser Gly Ser Leu Gly Ser Gly Leu Gly Ser Gly Ser Gly
          1060   1065   1070

Ser Gly Ser His Glu Gly Gly Ser Thr Ser Ala Ser Ile Thr Arg Ser
      1075   1080   1085

Ser Gln Ser Ser His Thr Ser Lys Tyr Phe Gly Ser Ile Asp Ser Ser
     1090   1095   1100

Glu Ala Glu Ala Gly Ala Ala Arg Gly Gly Ala Glu Pro Gly Asp Gln
1105   1110   1115   1120

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Val Ile Lys Tyr Val Leu Gln Asp Pro Ile Trp Leu Leu Met Ala Asn
                1125   1130   1135

Ala Asp Gln Arg Val Met Met Thr Tyr Gln Val Pro Ser Arg Asp Met
                1140   1145   1150

Thr Ser Val Leu Lys Gln Asp Arg Glu Arg Leu Arg Ala Met Gln Lys
                1155   1160   1165

Gln Gln Pro Arg Phe Ser Glu Asp Gln Arg Arg Glu Leu Gly Ala Val
            1170   1175   1180

His Ser Trp Val Arg Lys Gly Gln Leu Pro Arg Ala Leu Asp Val Met
1185   1190   1195   1200

Ala Cys Val Asp Cys Gly Ser Ser Thr Gln Asp Pro Gly His Pro Asp
                1205   1210   1215

Asp Pro Leu Phe Ser Glu Leu Asp Gly Leu Gly Leu Glu Pro Met Glu
                1220   1225   1230

Glu Gly Gly Gly Glu Gln Gly Ser Ser Gly Gly Gly Ser Gly Glu Gly
            1235   1240   1245

Glu Gly Cys Glu Glu Ala Gln Gly Gly Ala Lys Ala Ser Ser Ser Gln
            1250   1255   1260

Asp Leu Ala Met Glu Glu Glu Glu Glu Gly Arg Ser Ser Ser Ser Pro
1265   1270   1275   1280

Ala Leu Pro Thr Ala Gly Asn Cys Thr Ser
                1285   1290

<210> 2
<211> 1291
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<400> 2

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Met Ser Gly Pro Leu Glu Gly Ala Asp Gly Gly Gly Asp Pro Arg Pro
1               5                   10                  15

Gly Glu Pro Phe Cys Pro Gly Gly Val Pro Ser Pro Gly Ala Pro Gln
                20                  25                  30

His Arg Pro Cys Pro Gly Pro Ser Leu Ala Asp Asp Thr Asp Ala Asn
                35                  40                  45

Ser Asn Gly Ser Ser Gly Asn Glu Ser Asn Gly Pro Glu Ser Arg Gly
        50                  55                  60

Ala Ser Gln Arg Ser Ser His Ser Ser Ser Ser Gly Asn Gly Lys Asp
65                  70                  75                  80

Ser Ala Leu Leu Glu Thr Thr Glu Ser Ser Lys Ser Thr Asn Ser Gln
                85                  90                  95

Ser Pro Ser Pro Pro Ser Ser Ser Ile Ala Tyr Ser Leu Leu Ser Ala
                100                 105                 110

Ser Ser Glu Gln Asp Asn Pro Ser Thr Ser Gly Cys Ser Ser Glu Gln
        115                 120                 125

Ser Ala Arg Ala Arg Thr Gln Lys Glu Leu Met Thr Ala Leu Arg Glu
        130                 135                 140

Leu Lys Leu Arg Leu Pro Pro Glu Arg Arg Gly Lys Gly Arg Ser Gly
145                 150                 155                 160

Thr Leu Ala Thr Leu Gln Tyr Ala Leu Ala Cys Val Lys Gln Val Gln
                165                 170                 175

Ala Asn Gln Glu Tyr Tyr Gln Gln Trp Ser Leu Glu Glu Gly Glu Pro
                180                 185                 190
```

```
Cys Ala Met Asp Met Ser Thr Tyr Thr Leu Glu Glu Leu Glu His Ile
         195                 200                 205

Thr Ser Glu Tyr Thr Leu Arg Asn Gln Asp Thr Phe Ser Val Ala Val
         210                 215                 220

Ser Phe Leu Thr Gly Arg Ile Val Tyr Ile Ser Glu Gln Ala Gly Val
225                 230                 235                 240

Leu Leu Arg Cys Lys Arg Asp Val Phe Arg Gly Ala Arg Phe Ser Glu
                 245                 250                 255

Leu Leu Ala Pro Gln Asp Val Gly Val Phe Tyr Gly Ser Thr Thr Pro
                 260                 265                 270

Ser Arg Leu Pro Thr Trp Gly Thr Gly Thr Ser Ala Gly Ser Gly Leu
         275                 280                 285

Lys Asp Phe Thr Gln Glu Lys Ser Val Phe Cys Arg Ile Arg Gly Gly
         290                 295                 300

Pro Asp Arg Asp Pro Gly Pro Arg Tyr Gln Pro Phe Arg Leu Thr Pro
305                 310                 315                 320

Tyr Val Thr Lys Ile Arg Val Ser Asp Gly Ala Pro Ala Gln Pro Cys
                 325                 330                 335

Cys Leu Leu Ile Ala Glu Arg Ile His Ser Gly Tyr Glu Ala Pro Arg
                 340                 345                 350

Ile Pro Pro Asp Lys Arg Ile Phe Thr Thr Arg His Thr Pro Ser Cys
         355                 360                 365

Leu Phe Gln Asp Val Asp Glu Arg Ala Ala Pro Leu Leu Gly Tyr Leu
         370                 375                 380

Pro Gln Asp Leu Leu Gly Ala Pro Val Leu Leu Phe Leu His Pro Glu
385                 390                 395                 400
```

Asp Arg Pro Leu Met Leu Ala Ile His Lys Lys Ile Leu Gln Leu Ala
                405   410   415

Gly Gln Pro Phe Asp His Ser Pro Ile Arg Phe Cys Ala Arg Asn Gly
                420   425   430

Glu Tyr Val Thr Met Asp Thr Ser Trp Ala Gly Phe Val His Pro Trp
                435   440   445

Ser Arg Lys Val Ala Phe Val Leu Gly Arg His Lys Val Arg Thr Ala
                450   455   460

Pro Leu Asn Glu Asp Val Phe Thr Pro Pro Ala Pro Ser Pro Ala Pro
465   470   475   480

Ser Leu Asp Ser Asp Ile Gln Glu Leu Ser Glu Gln Ile His Arg Leu
                485   490   495

Leu Leu Gln Pro Val His Ser Ser Ser Pro Thr Gly Leu Cys Gly Val
                500   505   510

Gly Pro Leu Met Ser Pro Gly Pro Leu His Ser Pro Gly Ser Ser Ser
                515   520   525

Asp Ser Asn Gly Gly Asp Ala Glu Gly Pro Gly Pro Pro Ala Pro Val
                530   535   540

Thr Phe Gln Gln Ile Cys Lys Asp Val His Leu Val Lys His Gln Gly
545   550   555   560

Gln Gln Leu Phe Ile Glu Ser Arg Ala Lys Pro Pro Pro Arg Pro Arg
                565   570   575

Leu Leu Ala Thr Gly Thr Phe Lys Ala Lys Val Leu Pro Cys Gln Ser
                580   585   590

Pro Asn Pro Glu Leu Glu Val Ala Pro Val Pro Asp Gln Ala Ser Leu

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```
          595                600                605

Ala Leu Ala Pro Glu Glu Pro Glu Arg Lys Glu Thr Ser Gly Cys Ser
    610                615                620

Tyr Gln Gln Ile Asn Cys Leu Asp Ser Ile Leu Arg Tyr Leu Glu Ser
625                630                635                640

Cys Asn Ile Pro Ser Thr Thr Lys Arg Lys Cys Ala Ser Ser Ser Ser
                645                650                655

Tyr Thr Ala Ser Ser Ala Ser Asp Asp Asp Lys Gln Arg Ala Gly Pro
                660                665                670

Val Pro Val Gly Ala Lys Lys Asp Pro Ser Ser Ala Met Leu Ser Gly
            675                680                685

Glu Gly Ala Thr Pro Arg Lys Glu Pro Val Val Gly Gly Thr Leu Ser
    690                695                700

Pro Leu Ala Leu Ala Asn Lys Ala Glu Ser Val Val Ser Val Thr Ser
705                710                715                720

Gln Cys Ser Phe Ser Ser Thr Ile Val His Val Gly Asp Lys Lys Pro
                725                730                735

Pro Glu Ser Asp Ile Ile Met Met Glu Asp Leu Pro Gly Leu Ala Pro
            740                745                750

Gly Pro Ala Pro Ser Pro Ala Pro Ser Pro Thr Val Ala Pro Asp Pro
            755                760                765

Thr Pro Asp Ala Tyr Arg Pro Val Gly Leu Thr Lys Ala Val Leu Ser
    770                775                780

Leu His Thr Gln Lys Glu Glu Gln Ala Phe Leu Asn Arg Phe Arg Asp
785                790                795                800
```

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Leu Gly Arg Leu Arg Gly Leu Asp Thr Ser Ser Val Ala Pro Ser Ala
                805   810   815

Pro Gly Cys His His Gly Pro Ile Pro Pro Gly Arg Arg His His Cys
            820   825   830

Arg Ser Lys Ala Lys Arg Ser Arg His His His His Gln Thr Pro Arg
            835   840   845

Pro Glu Thr Pro Cys Tyr Val Ser His Pro Ser Pro Val Pro Ser Ser
        850   855   860

Gly Pro Trp Pro Pro Pro Pro Ala Thr Thr Pro Phe Pro Ala Met Val
865   870   875   880

Gln Pro Tyr Pro Leu Pro Val Phe Ser Pro Arg Gly Gly Pro Gln Pro
                885   890   895

Leu Pro Pro Ala Pro Thr Ser Val Ser Pro Ala Thr Phe Pro Ser Pro
            900   905   910

Leu Val Thr Pro Met Val Ala Leu Val Leu Pro Asn Tyr Leu Phe Pro
            915   920   925

Thr Pro Pro Ser Tyr Pro Tyr Gly Val Ser Gln Ala Pro Val Glu Gly
        930   935   940

Pro Pro Thr Pro Ala Ser His Ser Pro Ser Pro Ser Leu Pro Pro Pro
945   950   955   960

Pro Leu Ser Pro Pro His Arg Pro Asp Ser Pro Leu Phe Asn Ser Arg
            965   970   975

Cys Ser Ser Pro Leu Gln Leu Asn Leu Leu Gln Leu Glu Glu Ser Pro
            980   985   990

Arg Thr Glu Gly Gly Ala Ala Ala Gly Gly Pro Gly Ser Ser Ala Gly
        995   1000   1005

Pro Leu Pro Pro Ser Glu Glu Thr Ala Glu Pro Glu Ala Arg Leu Val
    1010   1015   1020

Glu Val Thr Glu Ser Ser Asn Gln Asp Ala Leu Ser Gly Ser Ser Asp
1025   1030   1035   1040

Leu Leu Glu Leu Leu Leu Gln Glu Asp Ser Arg Ser Gly Thr Gly Ser
            1045   1050   1055

Ala Ala Ser Gly Ser Leu Gly Ser Gly Leu Gly Ser Gly Ser Gly Ser
            1060   1065   1070

Gly Ser His Glu Gly Gly Ser Thr Ser Ala Ser Ile Thr Arg Ser Ser
            1075   1080   1085

Gln Ser Ser His Thr Ser Lys Tyr Phe Gly Ser Ile Asp Ser Ser Glu
        1090   1095   1100

Ala Glu Ala Gly Ala Ala Arg Ala Arg Thr Glu Pro Gly Asp Gln Val
1105   1110   1115   1120

Ile Lys Cys Val Leu Gln Asp Pro Ile Trp Leu Leu Met Ala Asn Ala
            1125   1130   1135

Asp Gln Arg Val Met Met Thr Tyr Gln Val Pro Ser Arg Asp Ala Ala
        1140   1145   1150

Ser Val Leu Lys Gln Asp Arg Glu Arg Leu Arg Ala Met Gln Lys Gln
        1155   1160   1165

Gln Pro Arg Phe Ser Glu Asp Gln Arg Arg Glu Leu Gly Ala Val His
    1170   1175   1180

Ser Trp Val Arg Lys Gly Gln Leu Pro Arg Ala Leu Asp Val Met Ala
1185   1190   1195   1200

Cys Val Asp Cys Gly Ser Ser Val Gln Asp Pro Gly His Ser Asp Asp

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```
                    1205                 1210                1215

    Pro Leu Phe Ser Glu Leu Asp Gly Leu Gly Leu Glu Pro Met Glu Glu
                1220                1225                1230

    Gly Gly Gly Glu Gly Gly Gly Cys Gly Val Gly Gly Gly Gly Gly Asp
                1235                1240                1245

    Gly Gly Glu Glu Ala Gln Thr Gln Ile Gly Ala Lys Gly Ser Ser Ser
                1250                1255                1260

    Gln Asp Ser Ala Met Glu Glu Glu Glu Gln Gly Gly Gly Ser Ser Ser
    1265                1270                1275                1280

    Pro Ala Leu Pro Ala Glu Glu Asn Ser Thr Ser
                    1285                1290
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<210> 3
<211> 3873
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(3873)

<400> 3
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Met Ser Gly Pro Leu Glu Gly Ala Asp Gly Gly Gly Asp Pro Arg Pro
1               5                   10                  15


ggg gaa tca ttt tgt cct ggg ggc gtc cca tcc cct ggg ccc cca cag        96
Gly Glu Ser Phe Cys Pro Gly Gly Val Pro Ser Pro Gly Pro Pro Gln
            20                  25                  30


cac cgg cct tgc cca ggc ccc agc ctg gcc gat gac acc gat gcc aac       144
His Arg Pro Cys Pro Gly Pro Ser Leu Ala Asp Asp Thr Asp Ala Asn
        35                  40                  45
```

agc aat ggt tca agt ggc aat gag tcc aac ggg cat gag tct aga ggc   192
Ser Asn Gly Ser Ser Gly Asn Glu Ser Asn Gly His Glu Ser Arg Gly
    50   55   60

gca tct cag cgg agc tca cac agc tcc tcc tca ggc aac ggc aag gac   240
Ala Ser Gln Arg Ser Ser His Ser Ser Ser Ser Gly Asn Gly Lys Asp
65   70   75   80

tca gcc ctg ctg gag acc act gag agc agc aag agc aca aac tct cag   288
Ser Ala Leu Leu Glu Thr Thr Glu Ser Ser Lys Ser Thr Asn Ser Gln
            85   90   95

agc cca tcc cca ccc agc agt tcc att gcc tac agc ctc ctg agt gcc   336
Ser Pro Ser Pro Pro Ser Ser Ser Ile Ala Tyr Ser Leu Leu Ser Ala
            100   105   110

agc tca gag cag gac aac ccg tcc acc agt ggc tgc agc agt gaa cag   384
Ser Ser Glu Gln Asp Asn Pro Ser Thr Ser Gly Cys Ser Ser Glu Gln
        115   120   125

tca gcc cgg gca agg act cag aag gaa ctc atg aca gca ctt cga gag   432
Ser Ala Arg Ala Arg Thr Gln Lys Glu Leu Met Thr Ala Leu Arg Glu
    130   135   140

ctc aag ctt cga ctg ccg cca gag cgc cgg ggc aag ggc cgc tct ggg   480
Leu Lys Leu Arg Leu Pro Pro Glu Arg Arg Gly Lys Gly Arg Ser Gly
145   150   155   160

acc ctg gcc acg ctg cag tac gca ctg gcc tgt gtc aag cag gtg cag   528
Thr Leu Ala Thr Leu Gln Tyr Ala Leu Ala Cys Val Lys Gln Val Gln
            165   170   175

gcc aac cag gaa tac tac cag cag tgg agc ctg gag gag ggc gag cct   576
Ala Asn Gln Glu Tyr Tyr Gln Gln Trp Ser Leu Glu Glu Gly Glu Pro
            180   185   190

tgc tcc atg gac atg tcc acc tat acc ctg gag gag ctg gag cac atc   624

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Cys Ser Met Asp Met Ser Thr Tyr Thr Leu Glu Glu Leu Glu His Ile
        195   200   205

acg tct gag tac aca ctt cag aac cag gat acc ttc tca gtg gct gtc   672
Thr Ser Glu Tyr Thr Leu Gln Asn Gln Asp Thr Phe Ser Val Ala Val
   210   215   220

tcc ttc ctg acg ggc cga atc gtc tac att tcg gag cag gca gcc gtc   720
Ser Phe Leu Thr Gly Arg Ile Val Tyr Ile Ser Glu Gln Ala Ala Val
225   230   235   240

ctg ctg cgt tgc aag cgg gac gtg ttc cgg ggt acc cgc ttc tct gag   768
Leu Leu Arg Cys Lys Arg Asp Val Phe Arg Gly Thr Arg Phe Ser Glu
          245   250   255

ctc ctg gct ccc cag gat gtg gga gtc ttc tat ggt tcc act gct cca   816
Leu Leu Ala Pro Gln Asp Val Gly Val Phe Tyr Gly Ser Thr Ala Pro
          260   265   270

tct cgc ctg ccc acc tgg ggc aca ggg gcc tca gca ggt tca ggc ctc   864
Ser Arg Leu Pro Thr Trp Gly Thr Gly Ala Ser Ala Gly Ser Gly Leu
          275   280   285

agg gac ttt acc cag gag aag tcc gtc ttc tgc cgt atc aga gga ggt   912
Arg Asp Phe Thr Gln Glu Lys Ser Val Phe Cys Arg Ile Arg Gly Gly
   290   295   300

cct gac cgg gat cca ggg cct cgg tac cag cca ttc cgc cta acc ccg   960
Pro Asp Arg Asp Pro Gly Pro Arg Tyr Gln Pro Phe Arg Leu Thr Pro
305   310   315   320

tat gtg acc aag atc cgg gtc tca gat ggg gcc cct gca cag ccg tgc   1008
Tyr Val Thr Lys Ile Arg Val Ser Asp Gly Ala Pro Ala Gln Pro Cys
          325   330   335

tgc ctg ctg att gca gag cgc atc cat tcg ggt tac gaa gct ccc cgg   1056
Cys Leu Leu Ile Ala Glu Arg Ile His Ser Gly Tyr Glu Ala Pro Arg
          340   345   350

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```
ata ccc cct gac aag agg att ttc act acg cgg cac aca ccc agc tgc     1104
Ile Pro Pro Asp Lys Arg Ile Phe Thr Thr Arg His Thr Pro Ser Cys
        355                 360                 365

ctc ttc cag gat gtg gat gaa agg gct gcc ccc ctg ctg ggc tac ctg     1152
Leu Phe Gln Asp Val Asp Glu Arg Ala Ala Pro Leu Leu Gly Tyr Leu
        370                 375                 380

ccc cag gac ctc ctg ggg gcc cca gtg ctc ctg ttc ctg cat cct gag     1200
Pro Gln Asp Leu Leu Gly Ala Pro Val Leu Leu Phe Leu His Pro Glu
385                 390                 395                 400

gac cga ccc ctc atg ctg gct atc cac aag aag att ctg cag ttg gcg     1248
Asp Arg Pro Leu Met Leu Ala Ile His Lys Lys Ile Leu Gln Leu Ala
                405                 410                 415

ggc cag ccc ttt gac cac tcc cct atc cgc ttc tgt gcc cgc aac ggg     1296
Gly Gln Pro Phe Asp His Ser Pro Ile Arg Phe Cys Ala Arg Asn Gly
                420                 425                 430

gag tat gtc acc atg gac acc agc tgg gct ggc ttt gtg cac ccc tgg     1344
Glu Tyr Val Thr Met Asp Thr Ser Trp Ala Gly Phe Val His Pro Trp
        435                 440                 445

agc cgc aag gta gcc ttc gtg ttg ggc cgc cac aaa gta cgc acg gcc     1392
Ser Arg Lys Val Ala Phe Val Leu Gly Arg His Lys Val Arg Thr Ala
        450                 455                 460

ccc ctg aat gag gac gtg ttc act ccc ccg gcc ccc agc cca gct ccc     1440
Pro Leu Asn Glu Asp Val Phe Thr Pro Pro Ala Pro Ser Pro Ala Pro
465                 470                 475                 480

tcc ctg gac act gat atc cag gag ctg tca gag cag atc cac cgg ctg     1488
Ser Leu Asp Thr Asp Ile Gln Glu Leu Ser Glu Gln Ile His Arg Leu
                485                 490                 495

ctg ctg cag ccc gtc cac agc ccc agc ccc acg gga ctc tgt gga gtc     1536
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```
Leu Leu Gln Pro Val His Ser Pro Ser Pro Thr Gly Leu Cys Gly Val
        500             505             510


ggc gcc gtg aca tcc cca ggc cct ctc cac agc cct ggg tcc tcc agt    1584
Gly Ala Val Thr Ser Pro Gly Pro Leu His Ser Pro Gly Ser Ser Ser
        515             520             525


gat agc aac ggg ggt gat gca gag ggg cct ggg cct cct gcg cca gtg    1632
Asp Ser Asn Gly Gly Asp Ala Glu Gly Pro Gly Pro Pro Ala Pro Val
        530             535             540


act ttc cag cag atc tgt aag gat gtg cat ctg gtg aag cac cag ggc    1680
Thr Phe Gln Gln Ile Cys Lys Asp Val His Leu Val Lys His Gln Gly
545             550             555             560


cag cag ctt ttt att gag tct cgg gcc cgg cct cag tcc cgg ccc cgc    1728
Gln Gln Leu Phe Ile Glu Ser Arg Ala Arg Pro Gln Ser Arg Pro Arg
            565             570             575


ctc cct gct aca ggc acg ttc aag gcc aag gcc ctt ccc tgc caa tcc    1776
Leu Pro Ala Thr Gly Thr Phe Lys Ala Lys Ala Leu Pro Cys Gln Ser
        580             585             590


cca gac cca gag ctg gag gcg ggt tct gct ccc gtc cag gcc cca cta    1824
Pro Asp Pro Glu Leu Glu Ala Gly Ser Ala Pro Val Gln Ala Pro Leu
        595             600             605


gcc ttg gtc cct gag gag gcc gag agg aaa gaa gcc tcc agc tgc tcc    1872
Ala Leu Val Pro Glu Glu Ala Glu Arg Lys Glu Ala Ser Ser Cys Ser
        610             615             620


tac cag cag atc aac tgc ctg gac agc atc ctc agg tac ctg gag agc    1920
Tyr Gln Gln Ile Asn Cys Leu Asp Ser Ile Leu Arg Tyr Leu Glu Ser
625             630             635             640


tgc aac ctc ccc agc acc act aag cgt aaa tgt gcc tcc tcc tcc tcc    1968
Cys Asn Leu Pro Ser Thr Thr Lys Arg Lys Cys Ala Ser Ser Ser Ser
            645             650             655
```

```
tat acc acc tcc tca gcc tct gac gac gac agg cag agg aca ggt cca      2016
Tyr Thr Thr Ser Ser Ala Ser Asp Asp Asp Arg Gln Arg Thr Gly Pro
            660                 665                 670

gtc tct gtg ggg acc aag aaa gat ccg ccg tca gca gcg ctg tct ggg      2064
Val Ser Val Gly Thr Lys Lys Asp Pro Pro Ser Ala Ala Leu Ser Gly
            675                 680                 685

gag ggg gcc acc cca cgg aag gag cca gtg gtg gga ggc acc ctg agc      2112
Glu Gly Ala Thr Pro Arg Lys Glu Pro Val Val Gly Gly Thr Leu Ser
            690                 695                 700

ccg ctc gcc ctg gcc aat aag gcg gag agt gtg gtg tcc gtc acc agt      2160
Pro Leu Ala Leu Ala Asn Lys Ala Glu Ser Val Val Ser Val Thr Ser
705                 710                 715                 720

cag tgt agc ttc agc tcc acc atc gtc cat gtg gga gac aag aag ccc      2208
Gln Cys Ser Phe Ser Ser Thr Ile Val His Val Gly Asp Lys Lys Pro
                725                 730                 735

ccg gag tcg gac atc atc atg atg gag gac ctg cct ggc cta gcc cca      2256
Pro Glu Ser Asp Ile Ile Met Met Glu Asp Leu Pro Gly Leu Ala Pro
            740                 745                 750

ggc cca gcc ccc agc cca gcc ccc agc ccc aca gta gcc cct gac cca      2304
Gly Pro Ala Pro Ser Pro Ala Pro Ser Pro Thr Val Ala Pro Asp Pro
            755                 760                 765

gcc cca gac gcc tac cgt cca gtg ggg ctg acc aag gcc gtg ctg tcc      2352
Ala Pro Asp Ala Tyr Arg Pro Val Gly Leu Thr Lys Ala Val Leu Ser
            770                 775                 780

ctg cac aca cag aag gaa gag caa gcc ttc ctc agc cgc ttc cga gac      2400
Leu His Thr Gln Lys Glu Glu Gln Ala Phe Leu Ser Arg Phe Arg Asp
785                 790                 795                 800

ctg ggc agg ctg cgt gga ctc gac agc tct tcc aca gct ccc tca gcc      2448
```

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```
            Leu Gly Arg Leu Arg Gly Leu Asp Ser Ser Ser Thr Ala Pro Ser Ala
                        805                 810                 815


            ctt ggc gag cga ggc tgc cac cac ggc ccc gca ccc cca agc cgc cga      2496
            Leu Gly Glu Arg Gly Cys His His Gly Pro Ala Pro Pro Ser Arg Arg
                        820                 825                 830


            cac cac tgc cga tcc aaa gcc aag cgc tca cgc cac cac cag aac cct      2544
            His His Cys Arg Ser Lys Ala Lys Arg Ser Arg His His Gln Asn Pro
                        835                 840                 845


            cgg gct gaa gcg ccc tgc tat gtc tca cac ccc tca ccc gtg cca ccc      2592
            Arg Ala Glu Ala Pro Cys Tyr Val Ser His Pro Ser Pro Val Pro Pro
                        850                 855                 860


            tcc acc ccc tgg ccc acc cca cca gcc act acc ccc ttc cca gcg gtt      2640
            Ser Thr Pro Trp Pro Thr Pro Pro Ala Thr Thr Pro Phe Pro Ala Val
            865                 870                 875                 880


            gtc cag ccc tac cct ctc cca gtg ttc tct cct cga gga ggc ccc cag      2688
            Val Gln Pro Tyr Pro Leu Pro Val Phe Ser Pro Arg Gly Gly Pro Gln
                        885                 890                 895


            cct ctt ccc cct gct ccc aca tct gtg ccc cca gct gct ttc ccc gcc      2736
            Pro Leu Pro Pro Ala Pro Thr Ser Val Pro Pro Ala Ala Phe Pro Ala
                        900                 905                 910


            cct ttg gtg acc cca atg gtg gcc ttg gtg ctc cct aac tat ctg ttc      2784
            Pro Leu Val Thr Pro Met Val Ala Leu Val Leu Pro Asn Tyr Leu Phe
                        915                 920                 925


            cca acc cca tcc agc tat cct tat ggg gca ctc cag acc cct gct gaa      2832
            Pro Thr Pro Ser Ser Tyr Pro Tyr Gly Ala Leu Gln Thr Pro Ala Glu
                        930                 935                 940


            ggg cct ccc act cct gcc tcg cac tcc cct tct cca tcc ttg ccc gcc      2880
            Gly Pro Pro Thr Pro Ala Ser His Ser Pro Ser Pro Ser Leu Pro Ala
            945                 950                 955                 960
```

```
ctc ccc ccg agt cct cct cac cgc ccg gac tct cca ctg ttc aac tcg    2928
Leu Pro Pro Ser Pro Pro His Arg Pro Asp Ser Pro Leu Phe Asn Ser
                965                 970                 975


aga tgc agc tct cca ctc cag ctc aat ctg ctg cag ctg gag gag ctc    2976
Arg Cys Ser Ser Pro Leu Gln Leu Asn Leu Leu Gln Leu Glu Glu Leu
                980                 985                 990


ccc cgt gct gag ggg gct gct gtt gca gga ggc cct ggg agc agt gcc    3024
Pro Arg Ala Glu Gly Ala Ala Val Ala Gly Gly Pro Gly Ser Ser Ala
            995                1000                1005


ggg ccc cca cct ccc agt gcg gag gct gct gag cca gag gcc aga ctg    3072
Gly Pro Pro Pro Pro Ser Ala Glu Ala Ala Glu Pro Glu Ala Arg Leu
        1010                1015                1020


gcg gag gtc act gag tcc tcc aat cag gac gca ctt tcc ggc tcc agt    3120
Ala Glu Val Thr Glu Ser Ser Asn Gln Asp Ala Leu Ser Gly Ser Ser
1025                1030                1035                1040


gac ctg ctc gaa ctt ctg ctg caa gag gac tcg cgc tcc ggc aca ggc    3168
Asp Leu Leu Glu Leu Leu Leu Gln Glu Asp Ser Arg Ser Gly Thr Gly
                1045                1050                1055


tcc gca gcc tcg ggc tcc ttg ggc tct ggc ttg ggc tct ggg tct ggt    3216
Ser Ala Ala Ser Gly Ser Leu Gly Ser Gly Leu Gly Ser Gly Ser Gly
                1060                1065                1070


tca ggc tcc cat gaa ggg ggc agc acc tca gcc agc atc act cgc agc    3264
Ser Gly Ser His Glu Gly Gly Ser Thr Ser Ala Ser Ile Thr Arg Ser
            1075                1080                1085


agc cag agc agc cac aca agc aaa tac ttt ggc agc atc gac tct tcc    3312
Ser Gln Ser Ser His Thr Ser Lys Tyr Phe Gly Ser Ile Asp Ser Ser
        1090                1095                1100


gag gct gag gct ggg gct gct cgg ggc ggg gct gag cct ggg gac cag    3360
```

Glu Ala Glu Ala Gly Ala Ala Arg Gly Gly Ala Glu Pro Gly Asp Gln
1105   1110   1115   1120

gtg att aag tac gtg ctc cag gat ccc att tgg ctg ctc atg gcc aat   3408
Val Ile Lys Tyr Val Leu Gln Asp Pro Ile Trp Leu Leu Met Ala Asn
            1125   1130   1135

gct gac cag cgc gtc atg atg acc tac cag gtg ccc tcc agg gac atg   3456
Ala Asp Gln Arg Val Met Met Thr Tyr Gln Val Pro Ser Arg Asp Met
            1140   1145   1150

acc tct gtg ctg aag cag gat cgg gag cgg ctc cga gcc atg cag aag   3504
Thr Ser Val Leu Lys Gln Asp Arg Glu Arg Leu Arg Ala Met Gln Lys
        1155   1160   1165

cag cag cct cgg ttt tct gag gac cag cgg cgg gaa ctg ggt gct gtg   3552
Gln Gln Pro Arg Phe Ser Glu Asp Gln Arg Arg Glu Leu Gly Ala Val
        1170   1175   1180

cac tcc tgg gtc cgg aag ggc caa ctg cct cgg gct ctt gat gtg atg   3600
His Ser Trp Val Arg Lys Gly Gln Leu Pro Arg Ala Leu Asp Val Met
1185   1190   1195   1200

gcc tgt gtg gac tgt ggg agc agc acc caa gat cct ggt cac cct gat   3648
Ala Cys Val Asp Cys Gly Ser Ser Thr Gln Asp Pro Gly His Pro Asp
            1205   1210   1215

gac cca ctc ttc tca gag ctg gat gga ctg ggg ctg gag ccc atg gaa   3696
Asp Pro Leu Phe Ser Glu Leu Asp Gly Leu Gly Leu Glu Pro Met Glu
            1220   1225   1230

gag ggt gga ggc gag cag ggc agc agc ggt ggc ggc agt ggt gag gga   3744
Glu Gly Gly Gly Glu Gln Gly Ser Ser Gly Gly Gly Ser Gly Glu Gly
        1235   1240   1245

gag ggc tgc gag gag gcc caa ggc ggg gcc aag gct tca agc tct cag   3792
Glu Gly Cys Glu Glu Ala Gln Gly Gly Ala Lys Ala Ser Ser Ser Gln
        1250   1255   1260

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```
gac ttg gct atg gag gag gag gaa gaa ggc agg agc tca tcc agt cca     3840
Asp Leu Ala Met Glu Glu Glu Glu Glu Gly Arg Ser Ser Ser Pro
1265          1270          1275          1280


gcc tta cct aca gca gga aac tgc acc agc tag                         3873
Ala Leu Pro Thr Ala Gly Asn Cys Thr Ser
              1285          1290
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<211> 3876
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<213> Mus musculus

<220>
<221> CDS
<222> (1)..(3876)

<400> 4

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Met Ser Gly Pro Leu Glu Gly Ala Asp Gly Gly Gly Asp Pro Arg Pro
1             5             10            15


gga gaa cct ttt tgt cct gga gga gtc cca tcc cct ggg gcc ccg cag     96
Gly Glu Pro Phe Cys Pro Gly Gly Val Pro Ser Pro Gly Ala Pro Gln
          20            25            30


cac cgg cct tgt cca ggc ccc agc ctg gct gat gac act gat gca aac     144
His Arg Pro Cys Pro Gly Pro Ser Leu Ala Asp Asp Thr Asp Ala Asn
          35            40            45


agc aat ggc tca agt ggc aat gag tcc aac gga ccc gag tcc agg ggc     192
Ser Asn Gly Ser Ser Gly Asn Glu Ser Asn Gly Pro Glu Ser Arg Gly
          50            55            60


gca tct cag cgg agt tct cat agt tcc tct tct ggc aat ggc aag gac     240
Ala Ser Gln Arg Ser Ser His Ser Ser Ser Ser Gly Asn Gly Lys Asp
65            70            75            80
```

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tca gct ctg ctg gag acc act gag agc agc aag agt aca aac tca cag 288
Ser Ala Leu Leu Glu Thr Thr Glu Ser Ser Lys Ser Thr Asn Ser Gln
      85   90   95

agc cca tcc cca ccc agc agc tcc att gcc tac agc ctc ctg agt gcg 336
Ser Pro Ser Pro Pro Ser Ser Ser Ile Ala Tyr Ser Leu Leu Ser Ala
      100   105   110

agc tca gag cag gac aac cca tct acc agt ggc tgc agc agt gaa cag 384
Ser Ser Glu Gln Asp Asn Pro Ser Thr Ser Gly Cys Ser Ser Glu Gln
      115   120   125

tca gct cga gcc agg acc cag aaa gaa ctc atg act gca ctt cgg gag 432
Ser Ala Arg Ala Arg Thr Gln Lys Glu Leu Met Thr Ala Leu Arg Glu
      130   135   140

ctc aaa ctt cga ctg cca cca gag cgt cgg ggc aag ggc cgc tct ggg 480
Leu Lys Leu Arg Leu Pro Pro Glu Arg Arg Gly Lys Gly Arg Ser Gly
145   150   155   160

acc ttg gcc aca ctg cag tac gct ctg gcc tgt gtc aag cag gtt cag 528
Thr Leu Ala Thr Leu Gln Tyr Ala Leu Ala Cys Val Lys Gln Val Gln
      165   170   175

gct aac cag gaa tat tac cag cag tgg agt ctg gag gag ggt gag cct 576
Ala Asn Gln Glu Tyr Tyr Gln Gln Trp Ser Leu Glu Glu Gly Glu Pro
      180   185   190

tgt gcc atg gac atg tct act tac acc ctg gag gaa ttg gag cat atc 624
Cys Ala Met Asp Met Ser Thr Tyr Thr Leu Glu Glu Leu Glu His Ile
      195   200   205

aca tcc gaa tac aca ctt cga aac cag gac acc ttc tct gtg gct gtg 672
Thr Ser Glu Tyr Thr Leu Arg Asn Gln Asp Thr Phe Ser Val Ala Val
      210   215   220

tcc ttc ctg aca ggc cgg att gtc tat att tcg gag cag gca ggt gtc 720

Ser Phe Leu Thr Gly Arg Ile Val Tyr Ile Ser Glu Gln Ala Gly Val
225   230   235   240

ctg ctg cgt tgc aaa cgg gat gtg ttt cgg ggt gcc cgc ttc tca gag   768
Leu Leu Arg Cys Lys Arg Asp Val Phe Arg Gly Ala Arg Phe Ser Glu
                245   250   255

ctc ctg gct ccc cag gat gtg ggt gtc ttc tat ggc tct act aca cca   816
Leu Leu Ala Pro Gln Asp Val Gly Val Phe Tyr Gly Ser Thr Thr Pro
                260   265   270

tct cga ctg ccc acc tgg ggc act ggc acc tct gca ggt tca ggt ctc   864
Ser Arg Leu Pro Thr Trp Gly Thr Gly Thr Ser Ala Gly Ser Gly Leu
                275   280   285

aag gac ttc acc cag gaa aag tct gtc ttc tgc cga atc aga gga ggt   912
Lys Asp Phe Thr Gln Glu Lys Ser Val Phe Cys Arg Ile Arg Gly Gly
                290   295   300

cct gac cgg gat cca ggg cct cgg tac cag cca ttc cgc cta acc cca   960
Pro Asp Arg Asp Pro Gly Pro Arg Tyr Gln Pro Phe Arg Leu Thr Pro
305   310   315   320

tat gtg acc aag att cgg gtc tca gat gga gcc cct gca cag ccg tgc   1008
Tyr Val Thr Lys Ile Arg Val Ser Asp Gly Ala Pro Ala Gln Pro Cys
                325   330   335

tgc cta ctc att gcc gag cgc atc cac tct ggt tat gaa gct ccc cgg   1056
Cys Leu Leu Ile Ala Glu Arg Ile His Ser Gly Tyr Glu Ala Pro Arg
                340   345   350

atc cct cct gac aag agg atc ttc acc acc cga cac aca cca agc tgc   1104
Ile Pro Pro Asp Lys Arg Ile Phe Thr Thr Arg His Thr Pro Ser Cys
                355   360   365

ctc ttc cag gat gta gat gaa agg gct gcc cca ctg ctg ggt tac ctt   1152
Leu Phe Gln Asp Val Asp Glu Arg Ala Ala Pro Leu Leu Gly Tyr Leu
                370   375   380

```
ccc cag gat ctc ctg ggg gct cca gta ctt ctc ttt cta cat cct gag        1200
Pro Gln Asp Leu Leu Gly Ala Pro Val Leu Leu Phe Leu His Pro Glu
385             390             395             400

gac cga ccc ctc atg ctg gcc att cat aag aag ata ctg cag ctg gca        1248
Asp Arg Pro Leu Met Leu Ala Ile His Lys Lys Ile Leu Gln Leu Ala
        405             410             415

ggc cag ccc ttt gac cat tcc cct att cgc ttc tgt gct cgg aac ggg        1296
Gly Gln Pro Phe Asp His Ser Pro Ile Arg Phe Cys Ala Arg Asn Gly
        420             425             430

gaa tat gtc acc atg gac acc agc tgg gcc ggt ttt gtg cac ccc tgg        1344
Glu Tyr Val Thr Met Asp Thr Ser Trp Ala Gly Phe Val His Pro Trp
        435             440             445

agc cgc aag gtg gct ttc gtg ttg ggt cgc cat aaa gtg cgc acg gca        1392
Ser Arg Lys Val Ala Phe Val Leu Gly Arg His Lys Val Arg Thr Ala
        450             455             460

ccc ctg aat gag gac gtc ttc act ccc cca gcc ccc agc cca gct ccg        1440
Pro Leu Asn Glu Asp Val Phe Thr Pro Pro Ala Pro Ser Pro Ala Pro
465             470             475             480

tcc ctg gac tct gat atc cag gag ctc tca gag cag atc cat cga ttg        1488
Ser Leu Asp Ser Asp Ile Gln Glu Leu Ser Glu Gln Ile His Arg Leu
            485             490             495

ctg ctg cag cct gtg cac agc tcc agc ccc acg ggg ctc tgt gga gtt        1536
Leu Leu Gln Pro Val His Ser Ser Ser Pro Thr Gly Leu Cys Gly Val
        500             505             510

ggc cct ctg atg tcc cct ggt cct cta cac agc cct ggc tcc tcc agt        1584
Gly Pro Leu Met Ser Pro Gly Pro Leu His Ser Pro Gly Ser Ser Ser
        515             520             525

gat agc aat ggg ggg gac gct gag ggg cct ggg cct cct gct cca gtg        1632
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```
Asp Ser Asn Gly Gly Asp Ala Glu Gly Pro Gly Pro Pro Ala Pro Val
    530                 535                 540


act ttc cag cag atc tgt aag gat gtg cat ctg gta aag cac cag gga      1680
Thr Phe Gln Gln Ile Cys Lys Asp Val His Leu Val Lys His Gln Gly
545                 550                 555                 560


caa cag ctc ttc att gaa tct cgg gcc aag ccc cca ccc cgg ccc cgc      1728
Gln Gln Leu Phe Ile Glu Ser Arg Ala Lys Pro Pro Pro Arg Pro Arg
                565                 570                 575


ctc ctt gct aca ggt aca ttc aaa gcc aaa gtc ctt ccc tgc cag tcc      1776
Leu Leu Ala Thr Gly Thr Phe Lys Ala Lys Val Leu Pro Cys Gln Ser
                580                 585                 590


cca aac ccc gaa ctg gag gtg gcc cca gtt cct gac caa gcc tcg tta      1824
Pro Asn Pro Glu Leu Glu Val Ala Pro Val Pro Asp Gln Ala Ser Leu
                595                 600                 605


gcc ttg gcc cct gag gag cca gag agg aaa gaa acc tct ggc tgt tcc      1872
Ala Leu Ala Pro Glu Glu Pro Glu Arg Lys Glu Thr Ser Gly Cys Ser
    610                 615                 620


tac cag cag atc aac tgc ctg gac agc atc ctc agg tat ttg gag agc      1920
Tyr Gln Gln Ile Asn Cys Leu Asp Ser Ile Leu Arg Tyr Leu Glu Ser
625                 630                 635                 640


tgc aac att ccc agt aca acc aag cgt aaa tgt gcc tcc tcc tcc tcc      1968
Cys Asn Ile Pro Ser Thr Thr Lys Arg Lys Cys Ala Ser Ser Ser Ser
                645                 650                 655


tac act gcc tct tca gcc tct gat gat gac aag cag agg gca ggt cca      2016
Tyr Thr Ala Ser Ser Ala Ser Asp Asp Asp Lys Gln Arg Ala Gly Pro
                660                 665                 670


gtt cct gtg ggg gcc aag aaa gat ccg tcg tca gca atg ctg tct ggg      2064
Val Pro Val Gly Ala Lys Lys Asp Pro Ser Ser Ala Met Leu Ser Gly
    675                 680                 685
```

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gag ggg gca act cct cgg aag gag cca gtg gtg gga ggc acc ctg agc   2112
Glu Gly Ala Thr Pro Arg Lys Glu Pro Val Val Gly Gly Thr Leu Ser
    690   695   700

ccg ctc gcc ctg gcc aat aag gca gag agc gtg gtg tcc gtc acc agt   2160
Pro Leu Ala Leu Ala Asn Lys Ala Glu Ser Val Val Ser Val Thr Ser
705   710   715   720

cag tgt agc ttc agc tcc acc atc gtc cat gtg gga gac aag aag ccc   2208
Gln Cys Ser Phe Ser Ser Thr Ile Val His Val Gly Asp Lys Lys Pro
                725   730   735

ccg gag tcg gac atc atc atg atg gaa gac ctg cct ggc ctg gcc cct   2256
Pro Glu Ser Asp Ile Ile Met Met Glu Asp Leu Pro Gly Leu Ala Pro
                740   745   750

ggc cca gcc ccc agt ccg gcc ccc agc ccc aca gta gcc cct gac cca   2304
Gly Pro Ala Pro Ser Pro Ala Pro Ser Pro Thr Val Ala Pro Asp Pro
                755   760   765

acc cca gat gct tat cgc cca gtg ggt ctg acc aag gcc gtg ctg tcc   2352
Thr Pro Asp Ala Tyr Arg Pro Val Gly Leu Thr Lys Ala Val Leu Ser
    770   775   780

ctg cac aca cag aag gaa gag caa gcc ttc ctc aac cgc ttc aga gat   2400
Leu His Thr Gln Lys Glu Glu Gln Ala Phe Leu Asn Arg Phe Arg Asp
785   790   795   800

ctt ggc agg ctt cgt gga ctt gac acc tct tct gtg gcc ccc tca gcc   2448
Leu Gly Arg Leu Arg Gly Leu Asp Thr Ser Ser Val Ala Pro Ser Ala
                805   810   815

cct ggc tgc cac cat ggc ccc att ccc cct ggt cgc cga cac cac tgc   2496
Pro Gly Cys His His Gly Pro Ile Pro Pro Gly Arg Arg His His Cys
                820   825   830

cga tct aaa gca aag cgt tcc cgc cac cac cac cac cag acc ccc cgg   2544

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Arg Ser Lys Ala Lys Arg Ser Arg His His His His Gln Thr Pro Arg
            835   840   845

ccc gaa act ccc tgc tat gtc tcc cat cct tca cct gtg ccc tct tct   2592
Pro Glu Thr Pro Cys Tyr Val Ser His Pro Ser Pro Val Pro Ser Ser
            850   855   860

gga ccc tgg cca ccc cca cca gcc acg acc ccc ttc cca gca atg gtc   2640
Gly Pro Trp Pro Pro Pro Pro Ala Thr Thr Pro Phe Pro Ala Met Val
865   870   875   880

cag ccc tac cca ctc cca gta ttc tcc cct cga gga gga ccc cag ccc   2688
Gln Pro Tyr Pro Leu Pro Val Phe Ser Pro Arg Gly Gly Pro Gln Pro
                    885   890   895

ctt ccc cct gcc cct aca tct gtg tcc cct gct acc ttc cct tct ccc   2736
Leu Pro Pro Ala Pro Thr Ser Val Ser Pro Ala Thr Phe Pro Ser Pro
                900   905   910

tta gtg acc cca atg gtg gcc ttg gtg ctc cct aac tat cta ttc cct   2784
Leu Val Thr Pro Met Val Ala Leu Val Leu Pro Asn Tyr Leu Phe Pro
                915   920   925

acc cca cct agt tat cca tat ggg gtg tcc cag gcc cct gtt gag ggg   2832
Thr Pro Pro Ser Tyr Pro Tyr Gly Val Ser Gln Ala Pro Val Glu Gly
            930   935   940

cca ccc acg cct gct tcc cac tcg ccc tct cca tcc ctg ccc cca cca   2880
Pro Pro Thr Pro Ala Ser His Ser Pro Ser Pro Ser Leu Pro Pro Pro
945   950   955   960

cct ctc agc ccc ccc cac cgc cca gac tcc cca ctg ttc aac tcg aga   2928
Pro Leu Ser Pro Pro His Arg Pro Asp Ser Pro Leu Phe Asn Ser Arg
                    965   970   975

tgc agc tcc cca ctc cag ctc aat ctg ctg cag ctt gag gag tcc ccc   2976
Cys Ser Ser Pro Leu Gln Leu Asn Leu Leu Gln Leu Glu Glu Ser Pro
                    980   985   990

```
cgc acg gag ggg ggc gct gct gca gga ggc cca gga agc agt gct ggg      3024
Arg Thr Glu Gly Gly Ala Ala Ala Gly Gly Pro Gly Ser Ser Ala Gly
        995                  1000             1005


ccc ctg cct ccc agt gag gag act gct gag cca gag gcc aga ttg gtg      3072
Pro Leu Pro Pro Ser Glu Glu Thr Ala Glu Pro Glu Ala Arg Leu Val
    1010              1015              1020


gag gtt act gag tcg tcc aat cag gat gca ctt tca ggc tcc agc gac      3120
Glu Val Thr Glu Ser Ser Asn Gln Asp Ala Leu Ser Gly Ser Ser Asp
1025              1030              1035              1040


ctg ctg gag cta ctg ctc caa gaa gac tct cgc tcg ggc aca ggc tcc      3168
Leu Leu Glu Leu Leu Leu Gln Glu Asp Ser Arg Ser Gly Thr Gly Ser
             1045              1050              1055


gca gcc tca ggc tcc ctg ggc tct ggc ctg ggc tct ggg tct ggt tca      3216
Ala Ala Ser Gly Ser Leu Gly Ser Gly Leu Gly Ser Gly Ser Gly Ser
             1060              1065              1070


gga tcc cac gaa ggg gga agc acc tca gcc agc atc acc cgc agc agt      3264
Gly Ser His Glu Gly Gly Ser Thr Ser Ala Ser Ile Thr Arg Ser Ser
             1075              1080              1085


cag agc agc cat aca agc aag tac ttt ggc agc atc gac tct tcc gag      3312
Gln Ser Ser His Thr Ser Lys Tyr Phe Gly Ser Ile Asp Ser Ser Glu
        1090              1095              1100


gct gaa gct ggg gct gct cgg gcc agg act gag cct ggg gac cag gtc      3360
Ala Glu Ala Gly Ala Ala Arg Ala Arg Thr Glu Pro Gly Asp Gln Val
1105              1110              1115              1120


att aag tgt gtg ctc cag gac ccc atc tgg ctg ctc atg gcc aat gcc      3408
Ile Lys Cys Val Leu Gln Asp Pro Ile Trp Leu Leu Met Ala Asn Ala
             1125              1130              1135


gac cag cgt gtc atg atg aca tac cag gtg ccg tcc agg gat gca gcc      3456
```

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Asp Gln Arg Val Met Met Thr Tyr Gln Val Pro Ser Arg Asp Ala Ala
        1140                1145            1150


tct gtg ctg aag caa gac cgg gag agg ctc cgg gcc atg cag aaa cag    3504
Ser Val Leu Lys Gln Asp Arg Glu Arg Leu Arg Ala Met Gln Lys Gln
        1155                1160            1165


cag cca cgg ttc tca gag gac cag agg cgg gaa ctg ggt gct gtg cac    3552
Gln Pro Arg Phe Ser Glu Asp Gln Arg Arg Glu Leu Gly Ala Val His
        1170                1175            1180


tcc tgg gtc cgg aag ggc cag ctg cct cgg gcc ctt gat gtg atg gcg    3600
Ser Trp Val Arg Lys Gly Gln Leu Pro Arg Ala Leu Asp Val Met Ala
1185                1190                1195            1200


tgt gtg gac tgt ggc agc agc gtt caa gat cct ggc cac tct gat gac    3648
Cys Val Asp Cys Gly Ser Ser Val Gln Asp Pro Gly His Ser Asp Asp
                1205                1210            1215


ccg ctc ttc tca gaa ctg gat gga ttg ggg ctg gag ccc atg gaa gag    3696
Pro Leu Phe Ser Glu Leu Asp Gly Leu Gly Leu Glu Pro Met Glu Glu
            1220                1225            1230


ggt gga ggc gag ggt ggt ggg tgt ggt gtt ggc ggc ggt ggg ggt gat    3744
Gly Gly Gly Glu Gly Gly Gly Cys Gly Val Gly Gly Gly Gly Gly Asp
        1235                1240            1245


ggt ggt gag gag gcc cag acc caa att ggg gct aag ggt tca agc tct    3792
Gly Gly Glu Glu Ala Gln Thr Gln Ile Gly Ala Lys Gly Ser Ser Ser
    1250                1255            1260


cag gac tct gcc atg gag gaa gaa gag caa ggt ggg ggc tca tcc agc    3840
Gln Asp Ser Ala Met Glu Glu Glu Glu Gln Gly Gly Gly Ser Ser Ser
1265                1270                1275            1280


cca gct tta cct gca gaa gaa aac agc acc agc tag               3876
Pro Ala Leu Pro Ala Glu Glu Asn Ser Thr Ser
            1285                1290
```